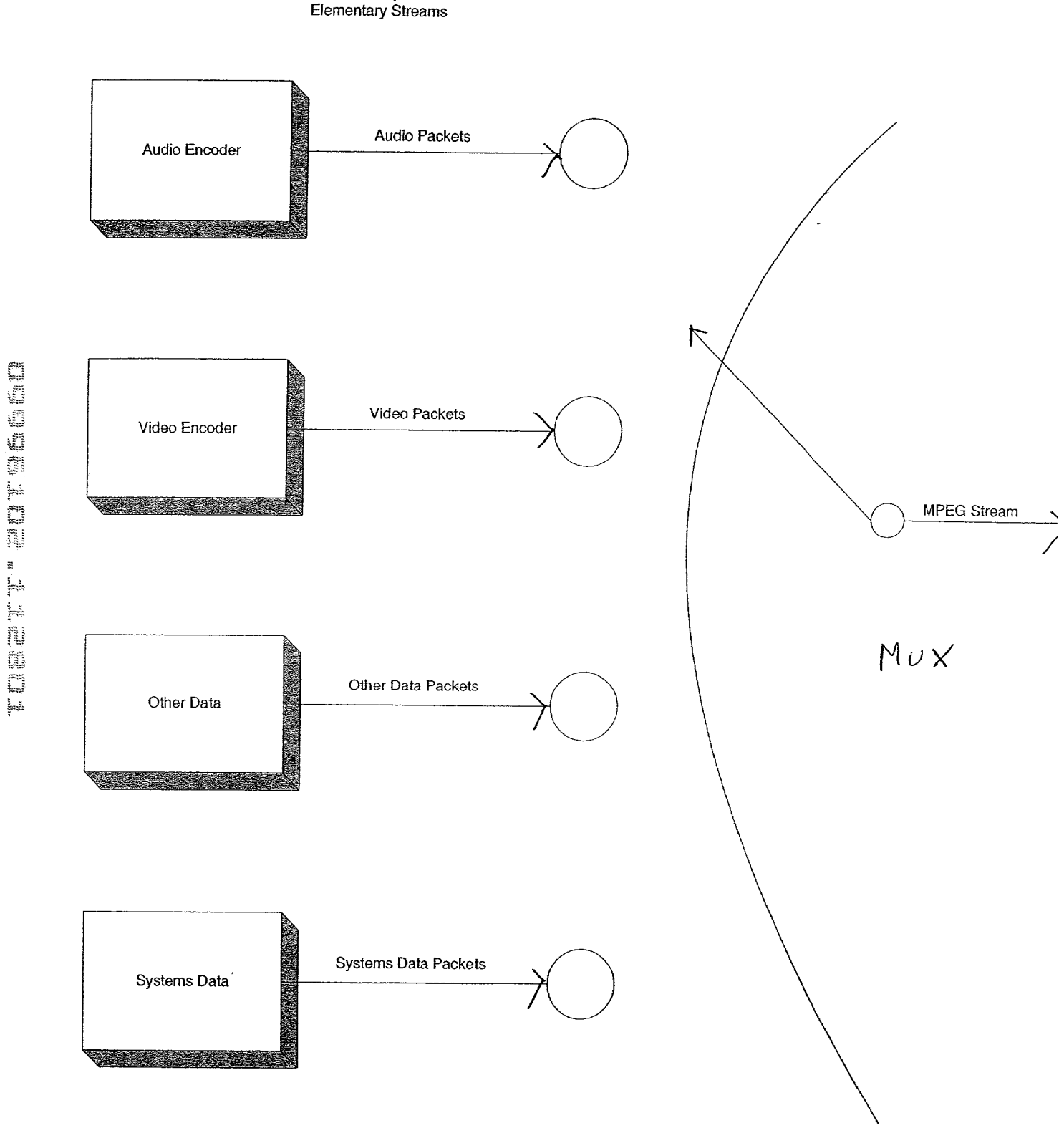
Elementary Streams
Audio Encoder
Audio Packets
Video Encoder
Video Packets
Other Data
Other Data Packets
Systems Data
Systems Data Packets
MPEG Stream
MUX

Fig. 1

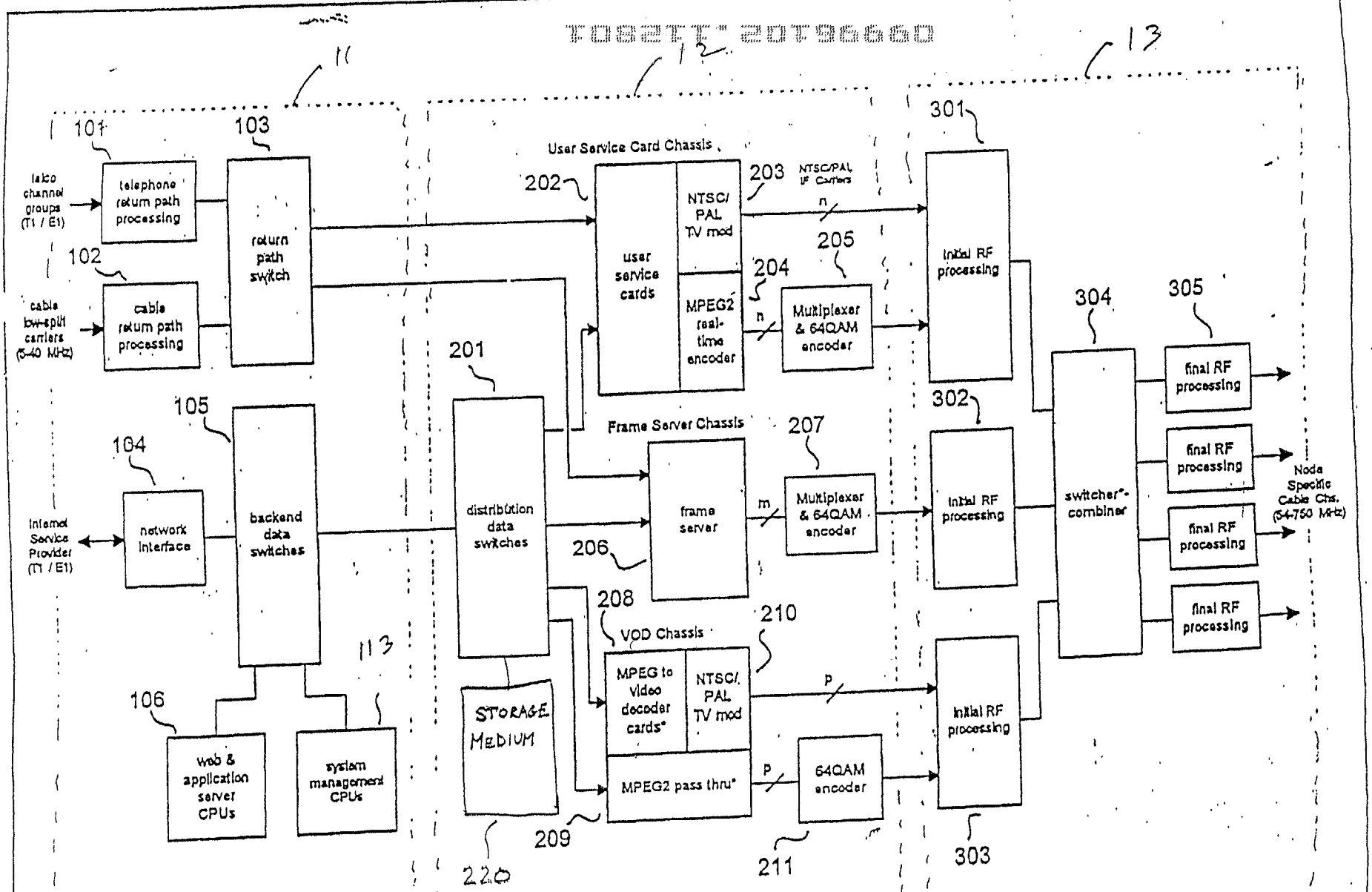
11
12
13
101
103
User Service Card Chassis
telco channel groups (T1 / E1)
telephone return path processing
return path switch
202
203
NTSC/PAL IF Carriers
n
NTSC/ PAL TV mod
user service cards
MPEG2 real-time encoder
204
205
Multiplexer & 64QAM encoder
301
Initial RF processing
102
cable low-split carriers (5-40 MHz)
cable return path processing
201
304
305
final RF processing
final RF processing
final RF processing
final RF processing
Node Specific Cable Chs. (54-750 MHz)
105
Frame Server Chassis
207
302
104
Internet Service Provider (T1 / E1)
network interface
backend data switches
distribution data switches
frame server
m
Multiplexer & 64QAM encoder
Initial RF processing
switcher*-combiner
206
208
210
VOD Chassis
113
106
MPEG to video decoder cards*
NTSC/ PAL TV mod
p
STORAGE MEDIUM
web & application server CPUs
system management CPUs
MPEG2 pass thru*
p
64QAM encoder
Initial RF processing
209
220
211
303

FIG. 2

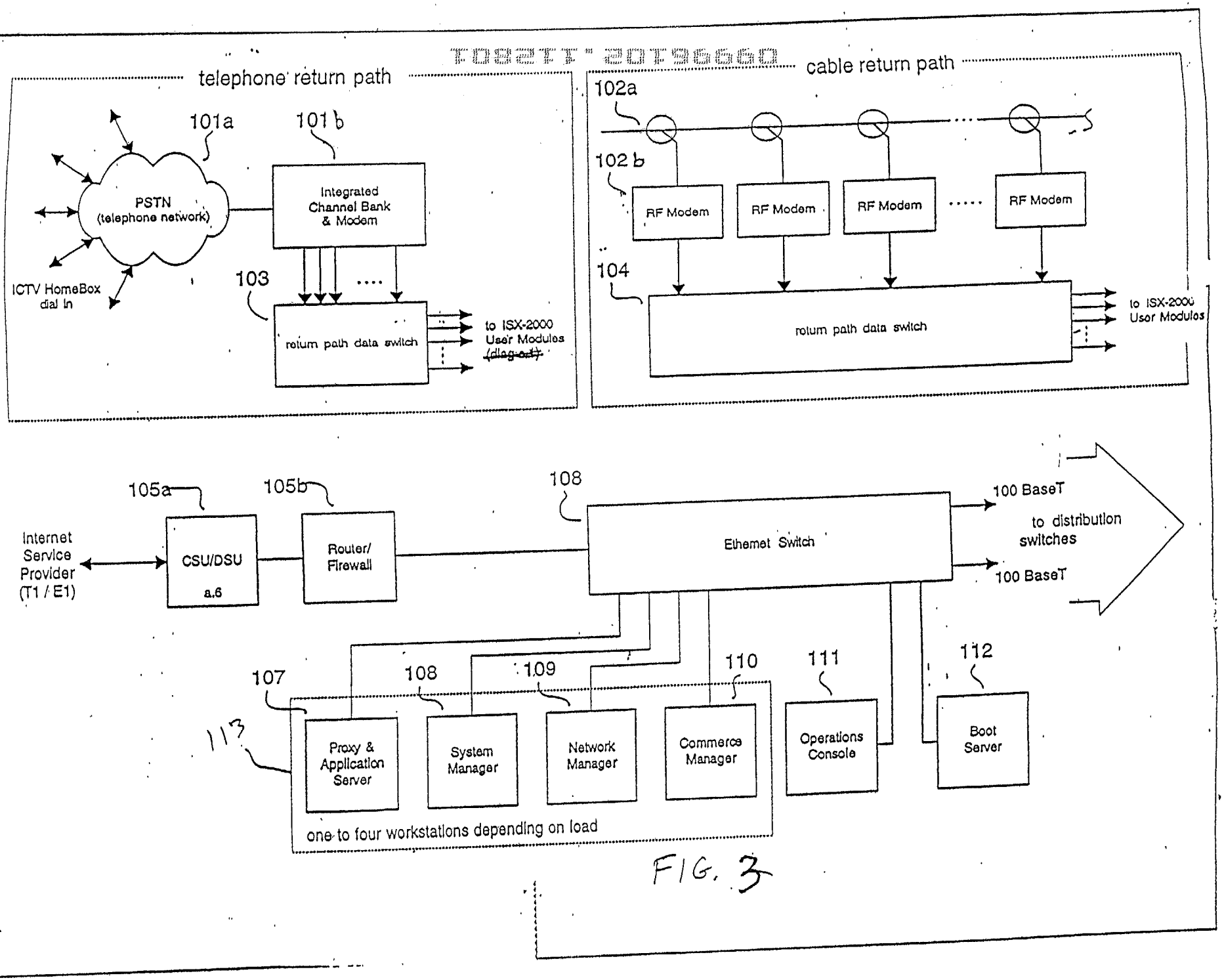
telephone return path
101a
101b
PSTN
(telephone network)
Integrated
Channel Bank
& Modem
ICTV HomeBox
dial In
103
return path data switch
to ISX-2000
User Modules
cable return path
102a
102b
RF Modem
RF Modem
RF Modem
RF Modem
104
return path data switch
to ISX-2000
User Modules
105a
105b
108
Internet
Service
Provider
(T1 / E1)
CSU/DSU
a.6
Router/
Firewall
Ethernet Switch
100 BaseT
to distribution
switches
100 BaseT
107
108
109
110
111
112
113
Proxy &
Application
Server
System
Manager
Network
Manager
Commerce
Manager
Operations
Console
Boot
Server
one to four workstations depending on load

FIG. 3

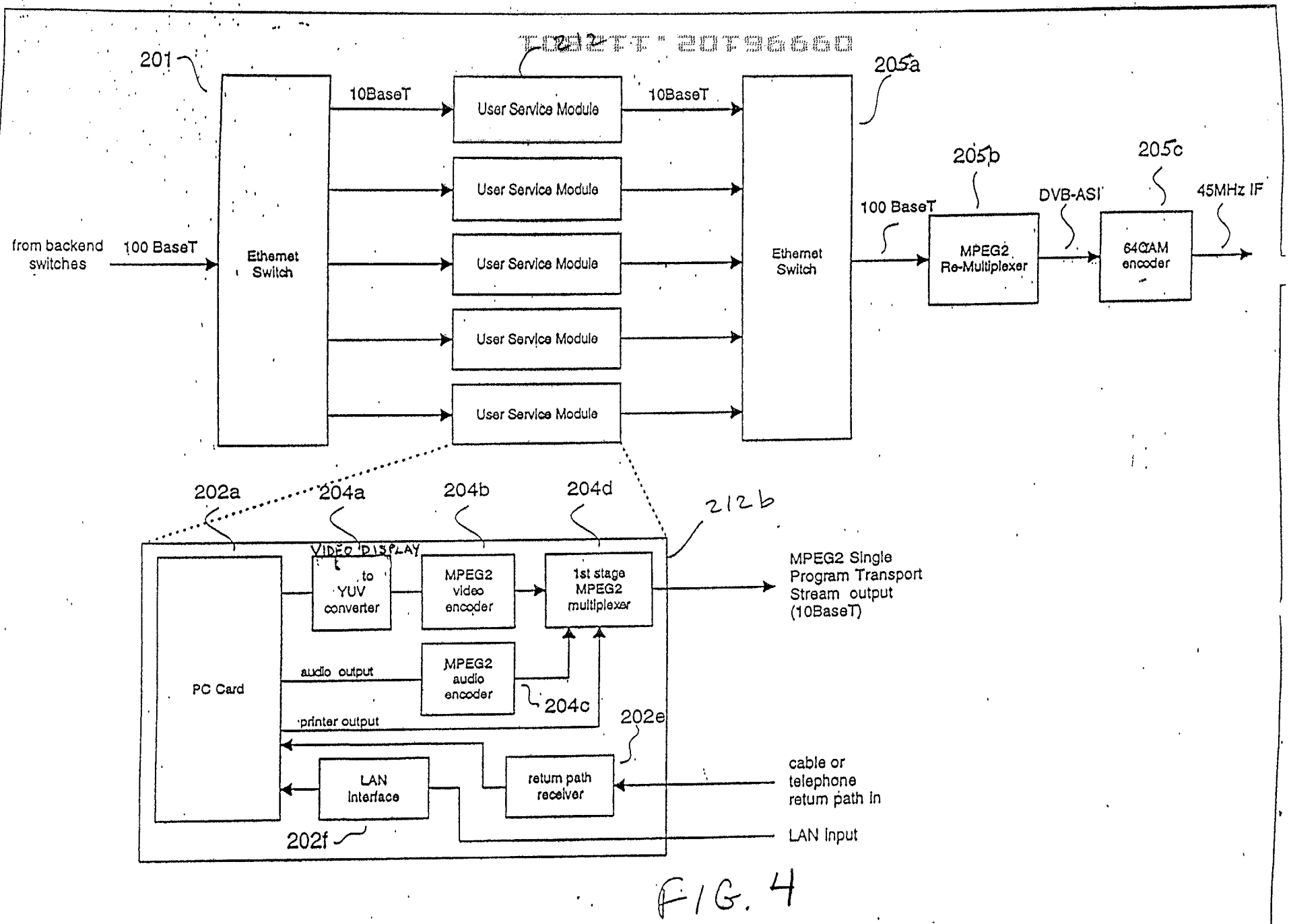
201
10BaseT
User Service Module
10BaseT
205a
User Service Module
User Service Module
User Service Module
User Service Module
from backend switches
100 BaseT
Ethernet Switch
Ethernet Switch
100 BaseT
205b
MPEG2 Re-Multiplexer
DVB-ASI
205c
64QAM encoder
45MHz IF
202a
204a
204b
204d
212b
VIDEO DISPLAY
to YUV converter
MPEG2 video encoder
1st stage MPEG2 multiplexer
MPEG2 Single Program Transport Stream output (10BaseT)
PC Card
audio output
MPEG2 audio encoder
204c
printer output
202e
LAN Interface
return path receiver
cable or telephone return path in
LAN input
202f

FIG. 4

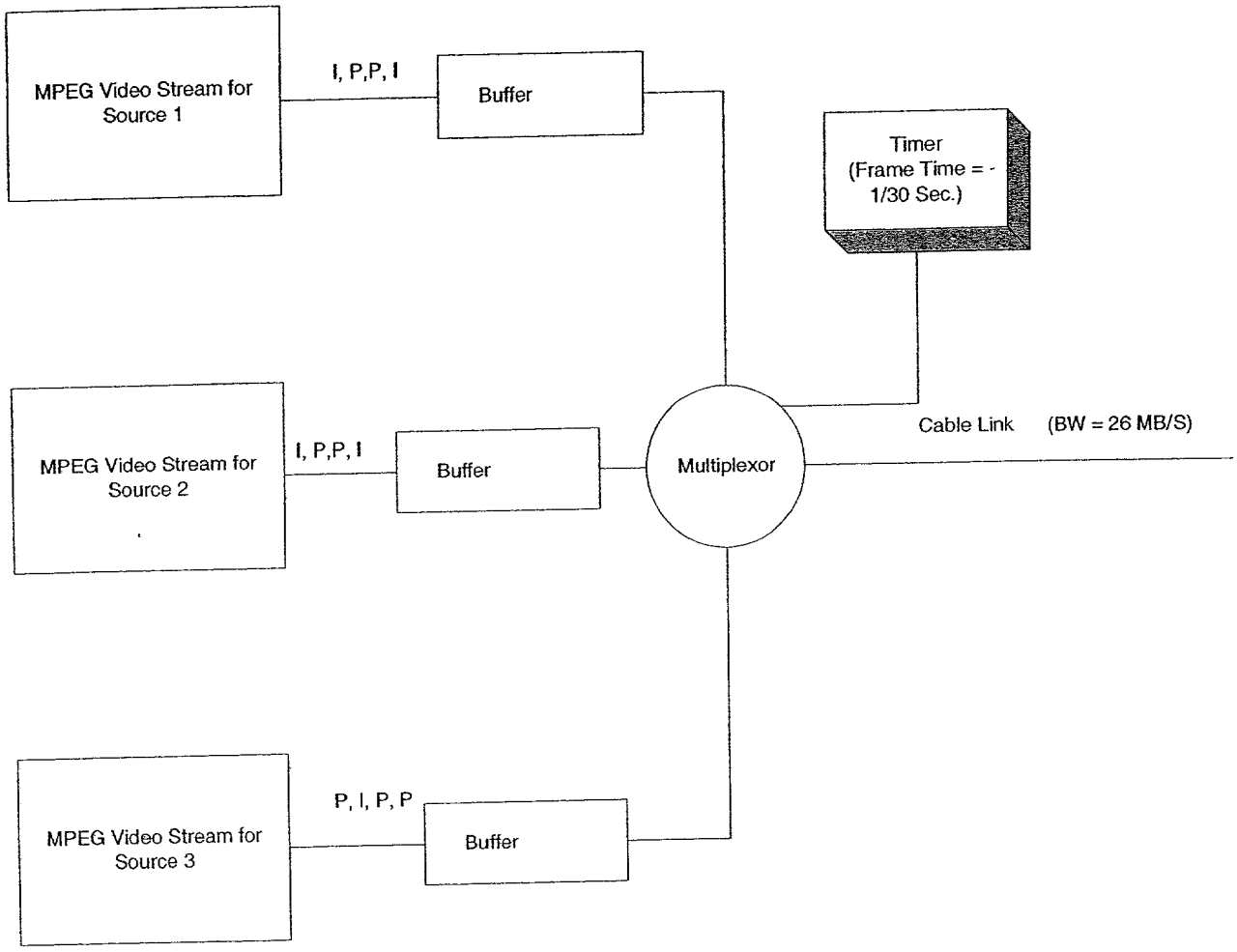
MPEG Video Stream for Source 1
I, P,P, I
Buffer
Timer (Frame Time = - 1/30 Sec.)
MPEG Video Stream for Source 2
I, P,P, I
Buffer
Multiplexor
Cable Link
(BW = 26 MB/S)
MPEG Video Stream for Source 3
P, I, P, P
Buffer

FIG. 5

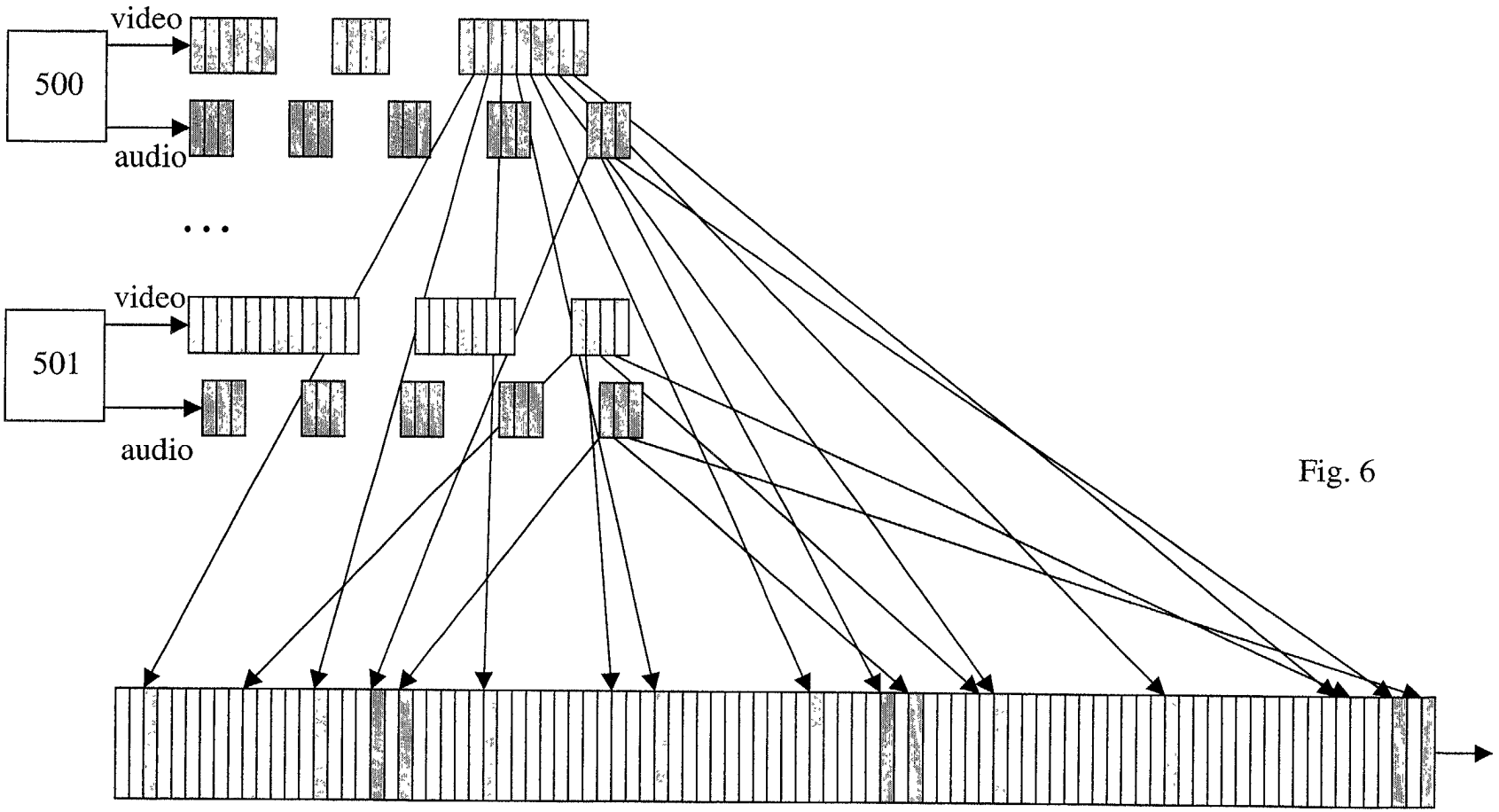
video
500
audio
video
501
audio
Output: MPEG Transport Stream
510

Fig. 6

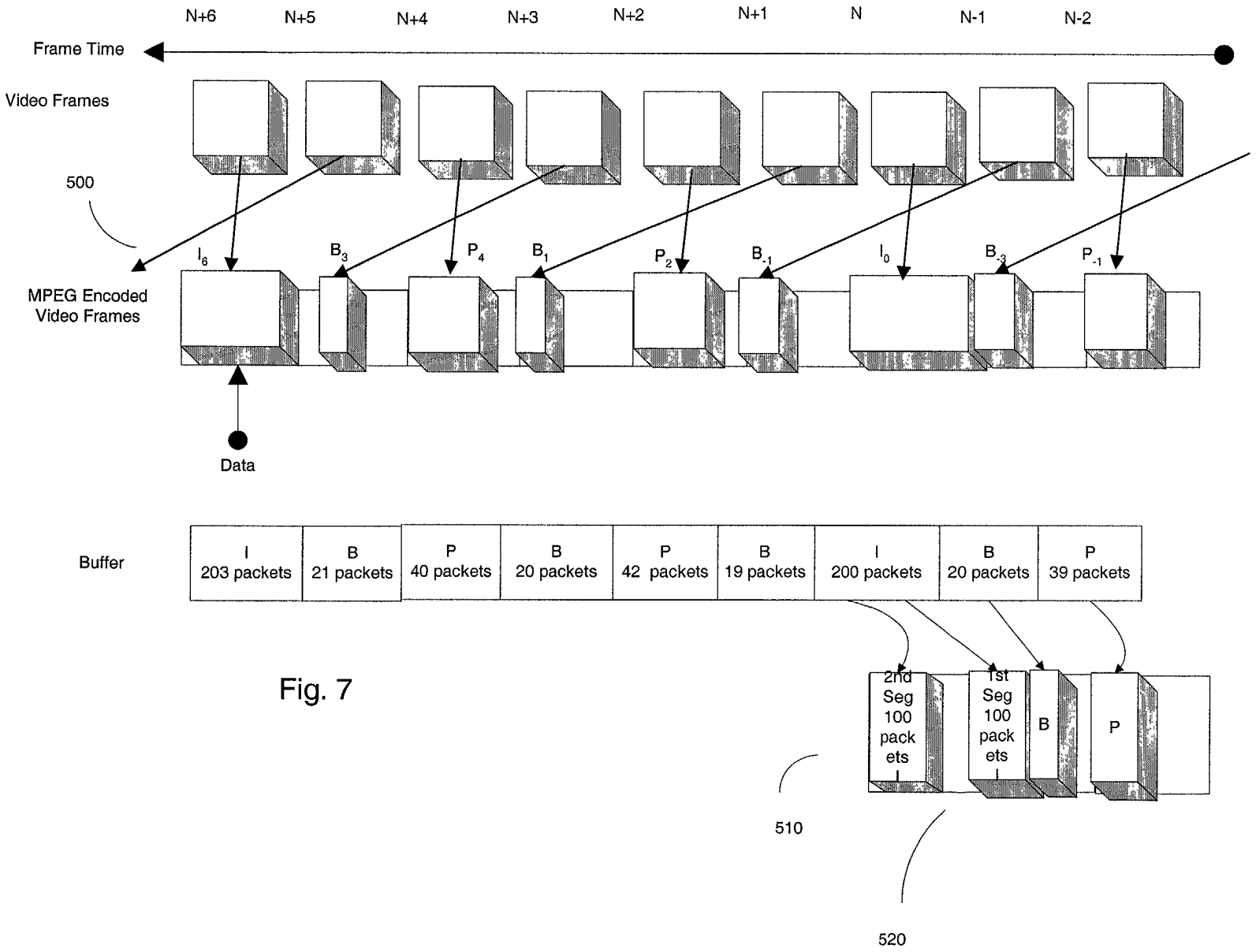
N+6
N+5
N+4
N+3
N+2
N+1
N
N-1
N-2
Frame Time
Video Frames
500
MPEG Encoded Video Frames
Data
Buffer
I 203 packets
B 21 packets
P 40 packets
B 20 packets
P 42 packets
B 19 packets
I 200 packets
B 20 packets
P 39 packets
2nd Seg 100 packets
1st Seg 100 packets
B
P
510
520

Fig. 7

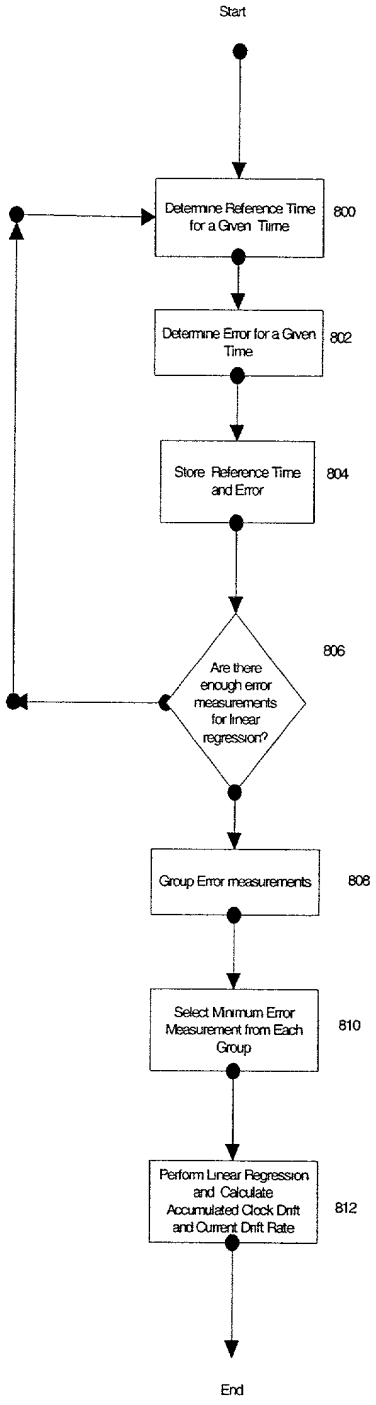
Start
Determine Reference Time for a Given Time
800
Determine Error for a Given Time
802
Store Reference Time and Error
804
Are there enough error measurements for linear regression?
806
Group Error measurements
808
Select Minimum Error Measurement from Each Group
810
Perform Linear Regression and Calculate Accumulated Clock Drift and Current Drift Rate
812
End

Fig. 8